

5 April 2022 (revised version)

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By email only

Dear Paul,

West Country North sources and transfers and Poole effluent recycling sources and transfers – Solution changes

Further to our site visits and meetings at Cheddar on 2nd February and in the Poole / Bournemouth area on the 16th of February, I am writing to propose some changes to the scope of the above strategic resource options (SROs) for your agreement. This letter is on behalf of all the solution partners for the two schemes (Wessex Water, South West Water, Bristol Water and Southern Water).

In the first phase of our gate two work our aim has been to address two of the key issues in your guidance (as well as the main factors affecting scheme feasibility):

- The need for alignment with regional plans and water resource management plans (WRMPs)
- Elimination of unfeasible or sub-optimal sub-options.

We are seeking to agree the changes now in order that the remainder of the gate two period can be as focused and efficient as possible.

Each of the key issues and related subjects are covered below using the following headings:

- alignment with regional plans
- elimination of unfeasible or sub-optimal sub-options
- sources of water
- remaining feasible options
- wider benefits
- solution partner changes
- summary of proposed way forward.

Alignment with regional plans

The emerging regional plans were published for consultation with stakeholders in January 2022. The relevant plans for our area are the West Country Water Resources Group (WCWRG) regional plan ([emerging-regional-plan-stakeholder-summary](#)) and the Water Resources South East (WRSE) regional plan ([wrse-regional-plan-jan-22-consultation-doc-final](#)). Prior to the finalisation of the emerging plans, and in accordance with your requirements, the two West Country SROs were offered into the modelling for WRSE's plan.

The two regional plans provide the following conclusions that are relevant to these two SROs:

West Country Water Resources Group regional plan

- There is a need to continue developing all the strategic options to ensure that the best set of options can be implemented in future, if they are needed.
- The Poole effluent recycling scheme may need to be operational in 2030-2040, and therefore design work will be required in 2025 – 2030. In effect a decision on the need will be made in the upcoming WRMP24. In addition, there is a need to align the SRO with Wessex Water’s Nitrogen & Phosphorus removal scheme which will be included in the PR24 WINEP.
- One or more of the other strategic options would commence construction in 2030 – 2040. Therefore appraisal on all the options and design work on the selected option will be required in 2025 – 2030, for a final decision on need in the next round of regional plans and WRMPs in 2027/28.

Water Resources South East regional plan

- Neither the West Country North SRO (Cheddar two) nor the Poole effluent recycling SRO feature in WRSE’s plan to 2040, nor in their plans to 2060 nor in the stress tests of the plan.
- It has already been agreed by RAPID that the schemes cannot assist with Southern Water’s section 20 needs in West Hampshire area due to programme constraints.
- The plan issued for consultation has been developed as a least cost plan. We are aware that the next iteration of the plan, following the consultation, will be to develop a “best value plan”. It is implausible that the two West Country SROs would generate more value than the currently selected options given their remoteness from WRSE and the need within the WCWRG region

Furthermore both Water Resource Management Planning guidelines and Natural England’s policy position indicate that exports should not be considered where they potentially put the donor region into deficit over the planning period.

Thus, given that the WCWRG regional plan identifies very significant deficits in the long term of up to 277 MI/d depending on the potential future scenarios, it is clear that the two schemes should be used to address in-region needs rather than be considered as inter-regional transfers to WRSE.

Elimination of unfeasible options

For the West Country North SRO, RAPID’s gate one decision document requested that we continue to investigate the following options

- Option 1: 16 MI/d treated water, Cheddar Two to Testwood;
- Option 2: 65 MI/d raw water, Cheddar Two to Testwood
- at least one “cascade” option through the existing companies’ networks with network reinforcement where necessary.

In addition, to meet in-region needs, we have retained another option (option 3) which comprises a potable transfer from Cheddar two reservoir to the centre of WSX’s area, following the same pipeline route as option 1.

We have concluded that option 2 and the cascade option are not technically feasible. The detailed assessment of these options and supporting evidence will be presented in a separate annex on rejected options in the gate two submission.

In summary the main reasons are:

Option 2: 65 MI/d raw water, Cheddar Two to Testwood

- A detailed, site specific assessment of Testwood Lakes (which comprises two lakes: Little Testwood Lake and Testwood Lake), including a site visit, concluded that the maximum, potential, storage capacity was only 230 MI, approximately half that assumed at gate one, making this option unfeasible.
- The current useable balancing capacity of Little Testwood lake, owned and operated by Southern Water, is approx. 124 MI. If the reservoir was dredged and cleaned so that the full capacity could be utilised, it would provide 230 MI of storage, as above. Options to raise the top water level are not feasible due to the lack of space for the enlarged embankments that would be required.
- The second lake, Testwood Lake, which is leased to and managed by Hampshire & Isle of Wight Wildlife Trust, is used as a wildlife reserve and also for amenity purposes. The biggest constraint on its use for water supply is that the lake and all the surrounding area to the north-east is the flood plain for the Rivers Blackwater and Test. Options to use the lake in its current situation or to raise the level of the lake are unfeasible due to the unacceptable impacts on water quality and flood risk. Therefore its available capacity is zero, making the total potential capacity of the two lakes 230 MI.
- Furthermore, the raw water transfer and buffer lake utilisation concept were specific to the Southern Water's Hampshire need, which is now being addressed through other solutions.

At least one "cascade" option through the existing companies' networks with network reinforcement, where required

- The potential to use existing water mains to convey water towards Testwood, from the west, was considered further as part of the West Country South sources & transfers SRO gate one study, and previously as part of the West Country North sources & transfers gate one submission in 2020.
- The existing water mains are of relatively small diameters and do not flow in the required direction. In the area under consideration there are no sources en-route which could enable water to be displaced eastwards, rather than increasing the total volume being conveyed in the pipes. It was concluded that there is very limited potential to use existing mains for conveyance.
- For example, a 16 MI/d transfer would require a 450 mm diameter pipeline, whereas the existing trunk mains range from 200 to 700 mm diameter. Furthermore, parts of the Wessex Water system are bi-directional so that they operate in different modes seasonally, depending on need (water quality, demand etc.) which is incompatible with uni-directional bulk transfers.
- As explained in our gate one report, the pipeline route from Cheddar to Testwood is 114 km long, as shown in Figure 4.1 from the report (which for ease we have reproduced in Appendix A). Over the first sector (41 km) and the last sector (43 km) there are no trunk mains as there has never been any need to transfer water in these areas. In the central sector there is some overlap with the WSX system but as explained above the mains are not of sufficient size to operate as a cascade and the operating patterns would be in conflict.
- Therefore it is concluded that a cascade option is not technically feasible.

Sources

As explained at our meetings and subsequent update briefings we have prioritised further investigation into the hydrology and water resources of the sources of water for both SROs.

A brief summary is provided below and further detail will be provided in our gate two submission.

Cheddar two reservoir

Using a 4,800 year stochastic data series of the flows at Cheddar springs and the River Axe, an Aquator water resources model has been developed to determine the ability of the sources to fill Cheddar two reservoir alongside Bristol Water's ongoing operation of the existing Cheddar reservoir. The analysis has identified that the reservoir could provide an Annual Average Deployable Output (ADO) of 14 MI/d during a severe drought with a return period of 1 in 500 years, with higher peak deployable outputs (PDO) possible during summer. Thus we conclude that Cheddar two reservoir is a viable source for a strategic water resource option. Some sensitivity analysis will be undertaken prior to the gate two submission particularly around the potential requirement to retain occasional high scour flows in the river to improve its geomorphological attributes.

Poole sewage treatment works effluent

Five years of daily inflow data (2015-2019) have been analysed and the minimum 7-day rolling average during the summer peak demand months (June, July and August) is 31.8 MI/d. This minimum flow condition could potentially be replicated across an entire month during a 1:500 year drought so this is considered a reasonably conservative estimate to adopt for the source availability during peak demand periods, across the droughts. With a 5% process loss from the existing treatment works and an additional 5% loss from a new wastewater recycling plant, the available resource for transfer would therefore be 28.6 MI/d. The analysis has estimated that the annual average resource availability in up to a 1:500 year drought would be 33.2 MI/d. The link between forecast future water demand in the area and resource availability has been considered and it is concluded that reductions in consumption, due to water efficiency, will be offset by increases in demand due to population growth and that effluent volumes will be relatively stable over the long term.

Remaining feasible options

The conclusion of the regional planning and the work completed on eliminating unfeasible options is summarised in the table below. It shows that the options to be taken forward to gate two are:

- *West Country North sources and transfers*. Option 3: potable transfer from Cheddar two reservoir to the centre of WSX's area
- *Poole effluent recycling sources and transfers*. Diversion of effluent from Poole to the River Stour for abstraction at Longham for potable use in Bournemouth and Poole.

SRO	Sub option	Aligned with emerging regional plans?	Technically feasible?	Carry forward to remainder of gate two?
West Country North sources and transfers	Option 1: 16 MI/d treated water, Cheddar Two to Testwood	No	Yes	No
	Option 2: 65 MI/d raw water, Cheddar Two to Testwood	No	No	No
	at least one "cascade" option through the existing companies' networks with network reinforcement where necessary	n/a	No	No
	Option 3: potable transfer from Cheddar two reservoir to the centre of WSX's area, following the same pipeline route as option 1	Yes	Yes	Yes
Poole effluent recycling sources and transfers –	Diversion of effluent from Poole to the River Stour for abstraction at Longham for potable use in Bournemouth and Poole	Yes	Yes	Yes
	Re-abstraction downstream, pumping station and raw water pipeline to Testwood	No	Yes	No

Wider benefits

We had a very constructive discussion with you, the EA and NE about the wider benefits of the Poole scheme at our meeting on 16 February 2022.

The wider benefits and reduced costs of using each scheme in-region are summarised below. We will provide further details in the gate two submission in November.

Poole effluent recycling sources and transfers SRO

- The concept of the scheme involves recycling the effluent rather than allowing it to discharge to the sea.
- Enhanced treatment is required at Poole to remove nitrogen and phosphorus over the next ten years to protect Holes Bay and Poole Harbour SSSI and SPA designated areas. Recycling the effluent means that the investment in enhanced treatment will result in a beneficial use for the effluent.

- The treated effluent may be discharged to the River Stour through a wetland and it will improve the river flow during dry periods, providing further environmental benefits.
- The scheme will allow abstraction at Matchams on the River Avon (Hampshire), which is also a SSSI, to be reduced by the equivalent amount (c. 30 MI/d). This element is phase 3A of the phased strategy for the Lower Avon and Knapp Mill that was agreed with the EA and NE in 2021. Natural England are very supportive.
- Compared with the scheme presented at gate one, there will be reduced costs from deletion of a river intake, preliminary treatment works, 55 km of pipeline and interim booster stations. The carbon footprint and environmental impact of the construction and operation will also reduce significantly.

West Country North sources and transfers

- The reservoir will be refilled by excess spring flows and from the River Axe alongside Cheddar one reservoir, within the existing abstraction licence conditions.
- The reservoir has previously obtained full permission. Although this has now lapsed the reservoir is consentable. The local residents and other stakeholders were previously supportive.
- No show stopper environmental issues have been identified.
- Some biodiversity and amenity gain from the new reservoir. Some flood alleviation and biodiversity gain in the area surrounding the proposed reservoir.
- Compared with the scheme presented at gate one there will be reduced costs from deletion of 60 km of pipeline and interim booster stations. The carbon footprint and environmental impact of the construction will also reduce significantly.

Solution partner changes

For both of these schemes there were three partners at PR19 including Southern Water, who were originally intended to be the beneficiary. With the change to the schemes being for in-region use only rather than inter-regional transfers as outlined above, it is not appropriate that Southern Water continue to fund their development. It is proposed that Southern Water drop out as a partner and that their share of the project budget is reallocated to the remaining partners on a pro rata basis, and that this change applies from the end of March 2022.

The relevant solution partner shares would be as shown in the table in Appendix B.

Proposed way forward

Therefore, in summary our proposed way forward and the changes in scope are as follows:

Aspect	Poole effluent recycling sources and transfers	West Country North sources and transfers
Solution change / Need	As an in-region option to address future deficits in the West Country, in particular the needs in Bournemouth Water's area and in the south of Wessex Water's area. No further work in gate two on the inter-regional transfer option to Southern Water at Testwood.	As an in-region option to address future deficits in the West Country, in particular the needs in the centre and north of Wessex Water's area, and in Bristol Water if required. No further work in gate two on the inter-regional transfer option to Southern Water at Testwood.
Option to be taken forward	Redirecting 30 Ml/d of effluent from Poole STW to the River Stour, on a "put and take" basis. The flow will then be re-abstracted at Bournemouth Water's Longham site for potable water treatment and distribution, including potentially a bulk supply back to Wessex Water.	Construction of the previously proposed second reservoir at Cheddar. The average yield is c 14 Ml/d, with more as a peak deployable output. Additional water treatment and transfer to the centre of Wessex Water's area using a new transfer pipeline.
Solution partner changes from April 2022 onwards	Wessex Water and South West Water	Wessex Water and Bristol Water

I have advised the relevant Board director in each company or arranged for them to be briefed on the changes set out above, and can confirm that they all in agreement.

We trust that our proposals are acceptable to RAPID and look forward to receiving confirmation of your agreement of our plans for the remainder of gate two. In the meantime we are proceeding on the basis of the proposals set out above.

Should you have any questions please do not hesitate to contact us.

Yours faithfully

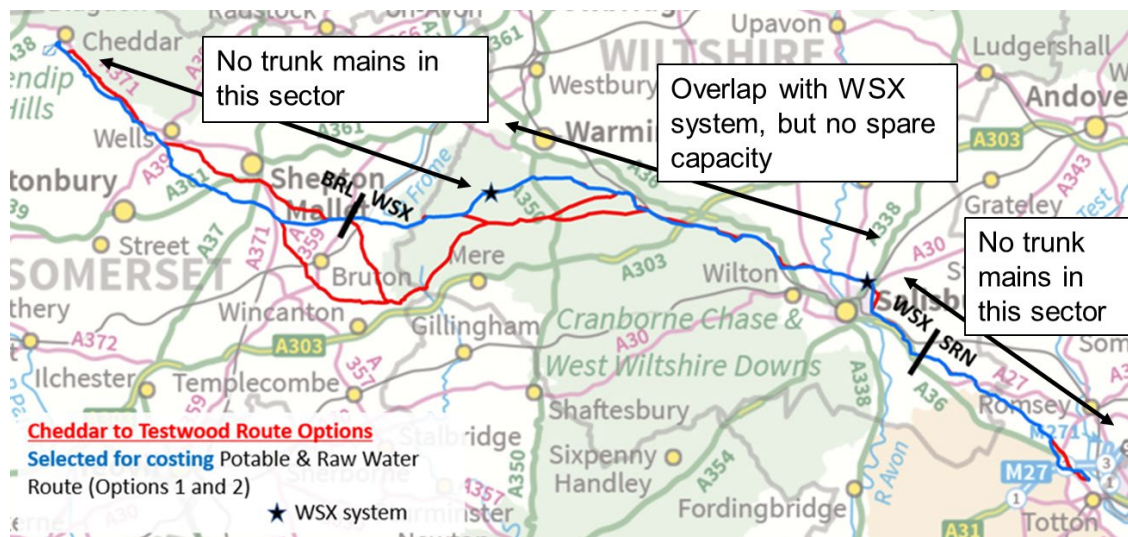
Julian Welbank
Programme Director – Strategic Resource Options for West Country Water Resources Group

Copy to:
Paul Merchant – South West Water
Paul Saynor – Wessex Water
Chris Esslin-Peard – Southern Water
Patric Bulmer – Bristol Water
Mick Flynn – Environment Agency (National appraisal unit)
Mark Taylor – Natural England

Appendix A – Transmission route from Cheddar to Testwood

West Country North sources & transfers

Gate one report - Figure 4.1. The asterisks indicate the extent of the WSX network.



Appendix B - Revised solution partner shares

SRO	SWB	WSX	SRN	BRL	Comments
Gate 2 original %s					
Poole effluent recycling and transfers	41.1%	29.5%	29.5%	0.0%	Revised following merging of 2 SROs as agreed with RAPID
West Country - Southern Water transfer	n/a	n/a	n/a	n/a	Stopped
West Country North sources & transfers	0.0%	29.6%	29.6%	40.9%	As original %s
Gate 2 revised %s for April 2022 onwards					
Poole effluent recycling and transfers	58.2%	41.8%	0.0%	0.0%	SRN drop out, pro rata balance
West Country - Southern Water transfer	n/a	n/a	n/a	n/a	Stopped
West Country North sources & transfers	0.0%	42.0%	0.0%	58.0%	SRN drop out, pro rata balance